LOUISIANA NATURAL AND SCENIC RIVERS SYSTEM

PERMIT APPLICATION

Permit # 873 (Assigned by Department)

The Louisiana Department of Wildlife and Fisheries' Scenic Rivers program is authorized by LRS title 56, Chapter 9 Part II. This law requires permits authorizing activities in or affecting rivers that have been designated by the Louisiana Legislature as Natural and Scenic. Information provided on this form will be used in evaluating the application for a permit. Information in this application is made a matter of public record through issuance of a public notice. Disclosure of the information requested is voluntary, however, the data requested are necessary in order to communicate with the applicant and to evaluate the permit application. If necessary information is not provided, the permit application cannot be processed nor can a permit be issued.

APPLICANT INFORMATION

Name of Applicant Angelina Gathering Company	Name of Agent (if any) Ryan Cornet - Landpoint, Inc.
Address 1000 Southwestern Energy Drive	Address 5486 Airline Drive
Address PO Box 789	Address
City, State, Zip Conway, AR 72032	City, State, Zip Bossier City, LA 71111
Phone 501-548-3719	Phone 318-317-2368

DESCRIPTION OF THE PROPOSED ACTIVITY

Brief summary of the description and purpose of the proposed activity (details to be attached as a separate document)

Directional bore beneath Corney Bayou to install a natural gas steel pipeline.

Is any portion of the activity complete? YES NO (If yes indicate month and year of completion)

LOCATION OF PROPOSED ACTIVITY

Stream Name	Corney Bayou	Names, Addresses, Phone Numbers of Adjacent Property Owners
Parish	Union	John Trimble, Jr., 114 West Main, El Dorado, AR 71730, (870) 863-3481
Section	13	Homer Farrar c/o Rose Holloway, 1209 Chestnut, Crossett, AR 71635, (870) 364 5572
Township	22 North	
Range	3 West	
Latitude/Longitude	32.898295 / -92.638557	

ENVIRONMENTAL ASSESSMENT

Must be a separate document. See the attached instruction sheet for completing the assessment.

CONFIRMATION OF INFORMATION ACCURACY

Application is hereby made for a Scenic River Use Permit to authorize the activities described herein. I certify that I am familiar with the information contained in this application, and that, to the best of my knowledge and belief, such information is true, complete, and accurate. I further certify that I possess the authority to undertake the proposed activities, or I am acting as the duly authorized agent of the applicant.

Ryan Cornet

Signature

5/31/13

Date

Form # LSR3 May 2002

ATTACHMENTS AND ENVIRONMENTAL ASSESSMENT

1. A complete description of the proposed project (including drawings).
2. A map showing the exact location of the project on the river.
3. Photographs of the project site from both banks of the river (if possible) and an upstream and downstream view of the project site from the project side of the river.
4. A list of all other local, state and federal permits required for this project.
5. An environmental assessment which includes separate evaluation of impacts on each of the following:

a. Existing Land Use
b. Historical/Archeological Sites
c. Economic Impact of the Project
d. Wilderness/Rural Quality
e. Scenic/Aesthetic Value
f. Recreational Use/Opportunities
g. Ecological Systems Present
h. Fish and Wildlife in the Area
i. Botanical Elements (Vegetation)
j. Geological Features
k. Hydrological Features
l. Water Quality/Quantity

For each of these criteria, detail existing conditions, potential adverse impacts, if any, and mitigative measures being taken to minimize, eliminate or compensate for those impacts. Provide a statement of justification for each proposed action and a discussion of any alternative locations and/or methods that were considered. If no impacts are projected for a criterion, then state that no impact is expected and give the reasons for that conclusion.

6. The signed original of the enclosed legal agreement.
7. A statement of the applicant=s compliance history. (Has the applicant ever been cited for a violation of the Scenic Rivers Act?)
8. A detailed listing of the steps that the applicant has taken in the development of the project to minimize and/or offset potential impacts to the river.
9. A listing of alternatives to the proposed project.

FEES AND OTHER CHARGES

The administrative fee for each application is $100.00 and must be submitted with the application. A fee of $135.00/day will be assessed for site visits and field evaluations if they are necessary. Make check payable to: State of Louisiana Scenic River Fund

Mail the completed application along with six (6) complete copies, the fee, and any additional charges to:

Louisiana Department of Wildlife and Fisheries
Scenic Rivers Program
P.O. Box 98000
Baton Rouge, LA 70898-9000
Telephone: (225) 343-4045

MAY 31, 2013

ANGELINA GATHERING COMPANY

ENVIRONMENTAL ASSESSMENT
FOR
LOUISIANA SCENIC RIVERS SYSTEM PERMIT
CORNEY BAYOU
UNION PARISH, LOUISIANA

PROPOSED HOLLIS PIPELINE
SECTION 13, TOWNSHIP 22 NORTH, RANGE 3 WEST

PREPARED FOR:

ANGELINA GATHERING COMPANY

1000 SOUTHWESTERN ENERGY DRIVE

P.O. BOX 789

CONWAY, ARKANSAS 72032

PREPARED BY:

LANDPOINT, INC.

5486 AIRLINE DRIVE

BOSSIER CITY, LOUISIANA 71111

318-226-0100

State of Louisiana

BOBBY JINDAL
GOVERNOR

DEPARTMENT OF WILDLIFE AND FISHERIES

ROBERT J. BARHAM
SECRETARY

Dear Scenic River Permit Applicant:

Please review and concur on the following statement regarding the issuance of permits by the Louisiana Department of Wildlife and Fisheries. This agreement must be signed and returned before a Scenic River Permit can be issued.

"I have been advised and do understand that by applying for and accepting a Scenic Rivers permit issued by the Louisiana Department of Wildlife and Fisheries, I am being allowed to engage in an activity which would otherwise be prohibited by law or for which a permit is required. I understand that the permit is not a license and confers no property right upon me. I specifically agree to abide by all State and Federal fish and wildlife laws and regulations, and all State and Federal laws and regulations which relate to this permit or the permitted activity, and by all other terms and conditions of this permit. I understand that the permit for which I am applying may be suspended, annulled, withdrawn or revoked and that I may be assessed civil penalties, all in accordance with the provision of the Louisiana Administrative Procedure Act, and that I may be denied future permits as a consequence of my failure to fully and completely comply with the terms and conditions of the permit, as well as other laws and regulations pertinent thereto. If served with or notified of a cease and desist order signed by the Scenic Rivers Administrator, I agree to immediately and without delay cease all activities and operations which relate to the permitted activity or which are impacting the Scenic River, until such time as the matter can be resolved in an adjudicatory hearing pursuant to the Louisiana Administrative Procedure Act. I understand and agree that any permit issued to me by the Louisiana Department of Wildlife and Fisheries is in the nature of a privilege which is being voluntarily extended to me by the Department and the failure on my part to cooperate with the Department can result in the loss of the privilege conferred and the denial of future requests for permits. By accepting this permit, I evidence my agreement to be bound by all conditions and stipulations set forth herein."

Heath Martin
Authorized Signature

6-18-13
Date

REV. 12/7/98

PUBLIC NOTICE

Request for Scenic Stream Permit for Corney Bayou

The Secretary of the Louisiana Department of Wildlife and Fisheries as Administrator of the Louisiana Natural and Scenic Rivers System is currently considering the application of Angelina Gathering Company for a permit to install an underground pipeline beneath Corney Bayou by using a horizontal directional bore. The decision to grant or deny this permit in the public interest will be based on an evaluation of the probable impacts of the proposed activity on Corney Bayou.

Copies of the application can be seen by the public at the Department of Wildlife and Fisheries main office, Room 430, 2000 Quail Drive, Baton Rouge, LA and at the District Office in the District where the proposed activity is located. The public is invited to comment on this permit request for a period of forty-five (45) days. Responses should convey sound reasoning for or against the proposal and be mailed to Scenic Rivers Program, LDWF, P.O. Box 98000, Baton Rouge, LA 70898-9000.

PROPOSED HOLLIS PIPELINE PROJECT
CORNEY BAYOU SCENIC STREAM PERMIT

PROJECT DESCRIPTION

The purpose of this activity is to route a natural gas pipeline across Corney Bayou, which is part of the Louisiana Natural and Scenic Rivers System. The proposed pipeline will transport natural gas. The proposal is to extend a pipeline from the proposed Hollis well location in Section 27, Township 22 North, Range 3 West to another proposed well location located in Section 6, Township 22 North, Range 2 West in Union Parish, Louisiana. The project will require a horizontal directional bore beneath the channel of Corney Bayou. The directional bore will be 909.99 feet in length and will extend 10 feet below the channel of Corney Bayou. A profile of the bore is attached. There will be no removal of trees along this section of pipeline to be bored. The proposed directional bore will not impact any jurisdictional wetlands. The wetland determination is based on soil descriptions, hydrophytic vegetation, and wetland hydrology data collected along the proposed route. This documentation is available in this report for your review and consideration.

LANDPOINT

www.landpoint.net (800) 348 - 5254

R-3-W

NOTE: THIS SURVEY IS SUBJECT TO POSSIBLE VISIBLE AND NON- VISIBLE EASEMENTS.

Restrictions on Use/Dissemination
For value received, Landpoint, Inc. has prepared a Survey Plat for Southwestern Energy Production Co. These Documents have been prepared for the exclusive use of Southwestern Energy Production Co. according to the terms and covenants of a mutual agreement. Use or reliance on the Survey Plat by any party other than Southwestern Energy Production Co. and his or her or its Legal representative is prohibited without permission in writing from the President of Landpoint, Inc.

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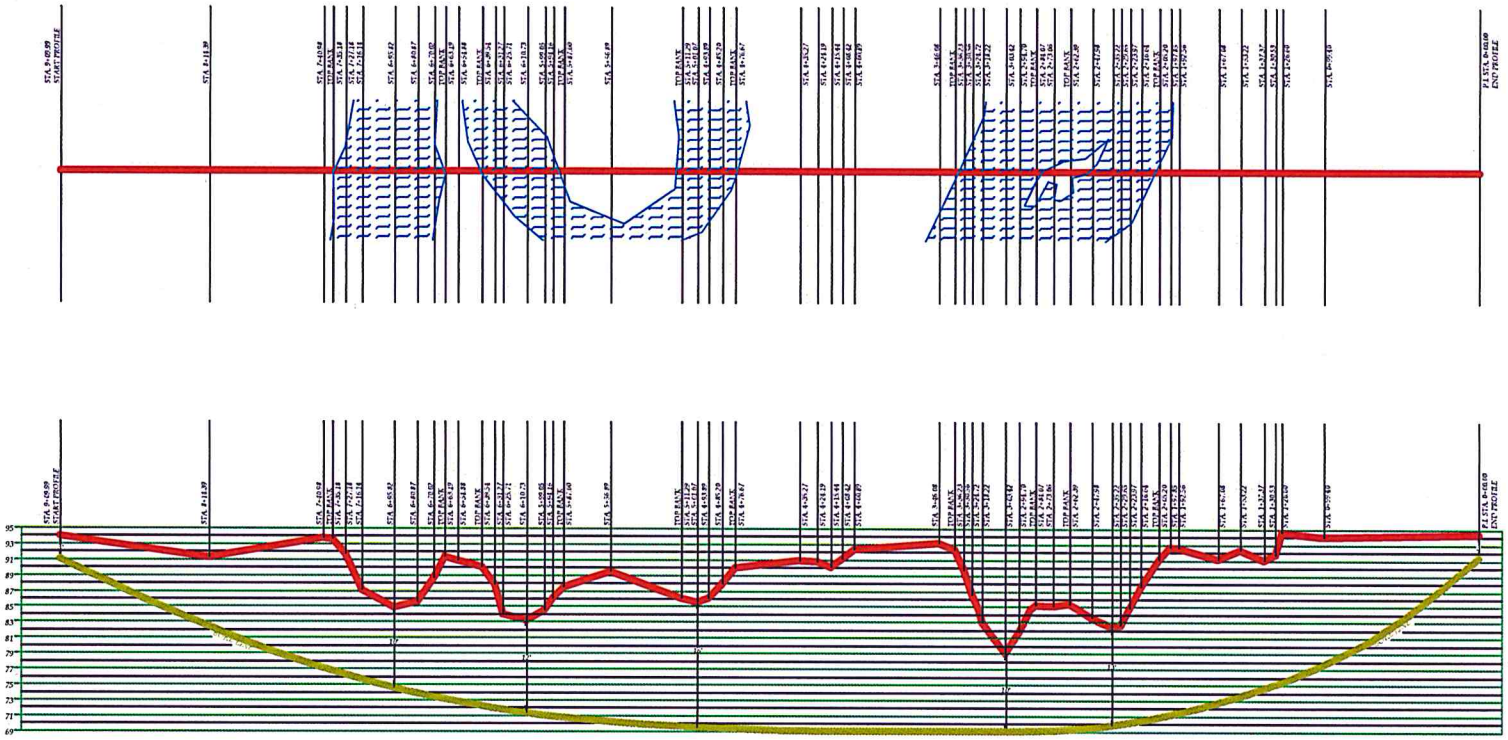


Corney Bayou Profile Survey

for Southwestern Energy Production Co.

Located in a Portion of

Section 13, Township 22 North, Range 3 West

Union Parish, Louisiana

HORIZ. SCALE: 1" = 50'
VERT. SCALE: 1" = 5'
DATE: 5/22/13
NUMBER: 13-1408
DRAWN: MANDY OGLESBY
COGO: 13 FINAL\13-1408.PRO
FILE NAME: 2013PLATS\13-1408.DWG

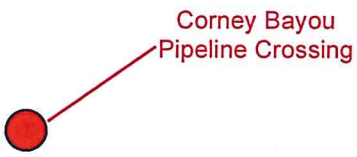
NOT TO SCALE

HORIZ. 1" = 50', VERT. 1" = 5'

LEGEND
SURFACE/CENTERLINE PIPELINE
PROPOSED BORE LINE

PROPOSED HOLLIS PIPELINE PROJECT
CORNEY BAYOU SCENIC STREAM PERMIT

LOCATION MAP



LANDPOINT

Corney Bayou Pipeline Crossing
Union Parish, Louisiana

1 Inch = 8,000 Feet

N
W E
S

May 24, 2013

Angelina Gathering Company

Sample Point 1

Sample Point 2

LANDPOINT

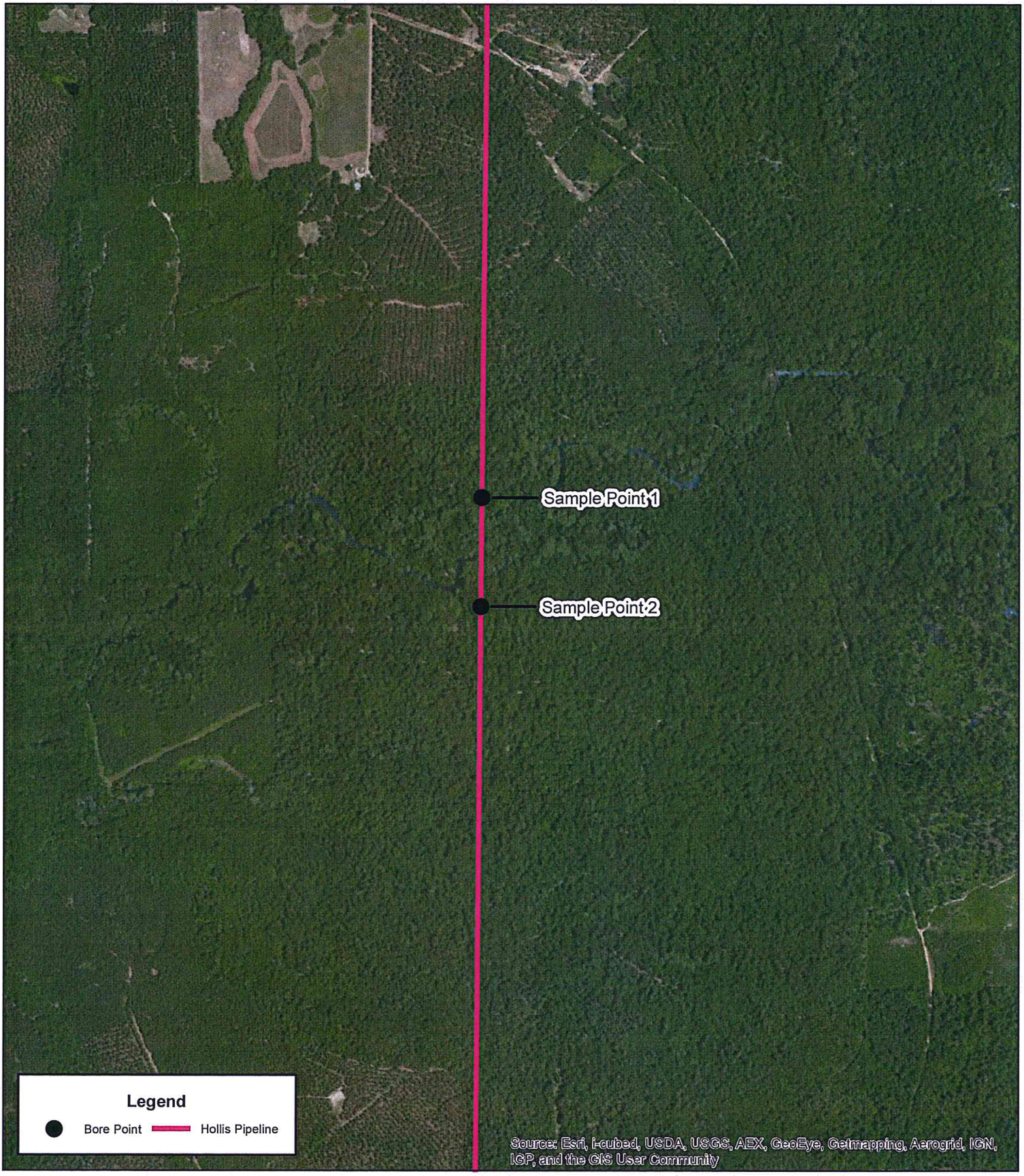
Corney Bayou Pipeline Crossing
Union Parish, Louisiana

1 Inch = 1,000 Feet

N
W
E
S

May 31, 2013

Angelina Gathering Company



Corney Bayou Pipeline Crossing
Union Parish, Louisiana

1 Inch = 1,000 Feet

N
W E
S

May 31, 2013

PROPOSED HOLLIS PIPELINE PROJECT
CORNEY BAYOU SCENIC STREAM PERMIT

Listed below are the environmental assessments and impacts on each of the listed items:

Existing Land Use:

Land use is forested mixed hardwoods. The property along the proposed pipeline route is owned by John Trimble Jr. These forested hardwood tracts are managed for timber production and recreational uses for hunting and fishing. There will be no adverse impacts on present land use by this proposed pipeline.

Historical/Archaeological Sites:

The entire proposed alignment route has been traversed by foot. There is no visible evidence of any historical/archaeological sites along this project site or adjacent to the proposed route. Angelina Gathering has agreed to contact professional archaeologists to conduct an in-depth evaluation. No known archaeological sites or historic properties will be affected by this undertaking. If any historical or cultural resources are encountered, the Cultural Resource Division will be notified immediately and construction will cease and await further instructions.

Economic Impact:

The economic impact for the area would be a benefit by creating employment opportunities for the local work force. The transport of the natural gas will help develop the potential of natural gas reserves in the area. The project would help the local, state, and national economy by supplying a much needed natural resource. There will be no adverse impacts on the economy from this project.

Wilderness/Rural Quality:

There will be no adverse impacts on wilderness/rural quality. The proposed directional bore is designed to eliminate any negative impact on Corney Bayou. There will be no removal of trees anywhere along this proposed bore project.

Scenic/Aesthetic Value:

The project will not have a negative impact on the scenic and aesthetic value. The area is now mixed hardwoods and the project land use will remain the same. There will be no removal of trees by this proposed project.

Recreational Use/Opportunities:

The project will not affect any recreational uses or opportunities that normally occur along Corney Bayou.

Ecological Systems Present:

There will be no change in present ecological systems. Management of the land will continue under the same system. There should be no alteration of the surface conditions.

Fish and Wildlife in the Area:

The project will have a minimum effect on fish and wildlife since the directional bore will be several feet away from Corney Bayou and at least 10 feet below it. There will be no runoff into Corney Bayou because the slope grades away from the high bank.

Botanical Elements (Vegetation):

The present vegetation adjacent to the project site is mostly mature mixed hardwoods.

Geological Features:

The geological feature at the site is the alluvial plain and channel of Corney Bayou. The jurisdictional area under the Scenic Stream Act is on the high bank and the natural levee of Corney Bayou. The bore entry and exit points are also on the high banks and natural levee of Corney Bayou.

Hydrological Features:

The entrance and exit points on the directional bore are on the high banks and natural levee of Corney Bayou. The soils at the entry point are identified as Ouachita Silt Loam. These soils are well drained and are classified as fluventic dystrochrepts. The soils at the exit point are somewhat excessively drained and are identified as Bienville Fine Sandy Loam. They are classified as psammentic paleudalfs. Ouachita and Bienville soils are non-hydric. This site is subject to rare flooding for very short durations after extended periods of heavy rainfall.

Alternate routes were considered, but were found to be less desirable. This proposed directional bore will not impact any jurisdictional areas. It is my opinion that no adverse impacts are expected with the planning and the construction methods that will be used to accomplish this proposed project. There will be no impact of wetlands or Waters of the US by this directional bore. See attached data sheets on vegetation, hydrology, and soil descriptions.

Angelina Gathering Company has not been cited for violations of the Scenic Stream Act. Erosion controls such as water barriers, silt fences, and hay bales will be used where needed. The erosion control structures will be monitored, as these steps will be taken in the development of the project to minimize and/or offset potential impacts to Corney Bayou.

POINT OF CONTACT

For additional information, please contact Mr. Heath Martin of Angelina Gathering Company or Mr. Ryan Cornet of Landpoint, Inc.

Heath Martin
Angelina Gathering Company, LLC
1000 Southwestern Energy Drive
Conway, Arkansas 72032
(501) 548-3719

Ryan Cornet
Landpoint, Inc.
5486 Airline Drive
Bossier City, Louisiana 71111
(318) 226-0100

ANGELINA GATHERING COMPANY

PROPOSED HOLLIS PIPELINE PROJECT
CORNEY BAYOU SCENIC STREAM PERMIT
UNION PARISH, LOUISIANA

ROUTINE WETLAND DETERMINATION DATA SHEETS

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Hollis Pipeline Corney Bayou Scenic River Permit City/County: Union Parish Sampling Date: 5/28/13

Applicant/Owner: Angelina Gathering Company State: LA Sampling Point: 1 of 2

Investigator(s): Ryan Cornet / Wayne Kilpatrick Section, Township, Range: 13-22N-3W

Landform (hillslope, terrace, etc.): Natural Levee Local relief (concave, convex, none): Convex Slope (%): 1-3

Subregion (LRR or MLRA): LRR P Lat: 32.89901 Long: -92.63917 Datum: NAD83

Soil Map Unit Name: Ouachita Silt Loam 1-3% Slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____ No X	
Wetland Hydrology Present?	Yes _____ No X	

Remarks:

North Bore Point of Corney Bayou Crossing

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 1 of 2

Tree Stratum (Plot size: 30' R)	Absolute % Cover	Dominant Species?	Indicator Status
1. QUERCUS PHELLOS	55	Y	FACW
2. QUERCUS FALCATA	40	Y	FACU
3. QUERCUS NIGRA	40	Y	FAC
4. LIQUIDAMBAR STYRACIFLUA	20	N	FAC
5. CARPINUS CAROLINIANA	20	N	FAC
6. CARYA TOMENTOSA	10	N	UPL
7.			
8.			
	185	= Total Cover	
50% of total cover: 92.5		20% of total cover: 37	

Sapling/Shrub Stratum (Plot size: 30' R)			
1. CARPINUS CAROLINIANA	40	Y	FAC
2. ULMUS CRASSIFOLIA	30	Y	FAC
3. QUERCUS FALCATA	20	N	FACU
4. LIQUIDAMBAR STYRACIFLUA	20	N	FAC
5. ILEX OPACA	10	N	FAC
6.			
7.			
8.			
	120	= Total Cover	
50% of total cover: 60		20% of total cover: 24	

Herb Stratum (Plot size: 30' R)			
1. LONICERA	15	Y	FAC
2. UNIOLA PANICULATA	15	Y	FACU
3. TOXICODENDRON RADICANS	15	Y	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	45	= Total Cover	
50% of total cover: 22.5		20% of total cover: 9	

Woody Vine Stratum (Plot size: 30' R)			
1. SMILAX ROTUNDIFOLIA	15	Y	FAC
2.			
3.			
4.			
5.			
	15	= Total Cover	
50% of total cover: 7.5		20% of total cover: 3	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 77 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	55	x 2 =	110
FAC species	225	x 3 =	675
FACU species	75	x 4 =	300
UPL species	10	x 5 =	50
Column Totals:	365 (A)		1135 (B)

Prevalence Index = B/A = 3.10

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 1 of 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10 YR 4/3	100					SIL	Ouachita Silt Loam 1-3% Slopes
4-12	10 YR 5/3	100					SIL	
12-18	10 YR 5/4	100					SICL	
18-32	10 YR 5/4	80	10 YR 5/3	20	C	M	SCL	
32-45	10 YR 5/6	70	10 YR 6/3	30	C	M	SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: N/A

Depth (inches): N/A

Hydric Soil Present? Yes _____ No X

Remarks:

Natural levee. Hydric soil not present.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Hollis Pipeline Corney Bayou Scenic River Permit City/County: Union Parish Sampling Date: 5/28/13

Applicant/Owner: Angelina Gathering Company State: LA Sampling Point: 2 of 2

Investigator(s): Ryan Cornet / Wayne Kilpatrick Section, Township, Range: 13-22N-3W

Landform (hillslope, terrace, etc.): Natural Levee Local relief (concave, convex, none): Convex Slope (%): 1-3

Subregion (LRR or MLRA): LRR P Lat: 32.896974 Long: -92.639188 Datum: NAD83

Soil Map Unit Name: Bienville Fine Sandy Loam 1-3% Slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____ No X	
Wetland Hydrology Present?	Yes _____ No X	

Remarks:

South Bore Point of Corney Bayou Crossing

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 2 of 2

Tree Stratum (Plot size: 30' R)	Absolute % Cover	Dominant Species?	Indicator Status
1. CARYA TOMENTOSA	60	Y	UPL
2. QUERCUS NIGRA	55	Y	FAC
3. QUERCUS ALBA	25	N	FACU
4. LIQUIDAMBAR STYRACIFLUA	20	N	FAC
5. QUERCUS STELLATA	15	N	FACU
6.			
7.			
8.			
	175	= Total Cover	
50% of total cover: 87.5	20% of total cover: 35		
Sapling/Shrub Stratum (Plot size: 30' R)			
1. CARYA TOMENTOSA	45	Y	UPL
2. ILEX OPACA	30	Y	FAC
3. GAYLUSSACIA BACCATA	25	Y	FACU
4. CARPINUS CAROLINIANA	25	Y	FAC
5. QUERCUS ALBA	15	N	FACU
6. QUERCUS FALCATA	15	N	FACU
7. CERCIS CANADENSIS	10	N	FACU
8. MORELLA CERIFERA	10	N	FAC
	175	= Total Cover	
50% of total cover: 87.5	20% of total cover: 35		
Herb Stratum (Plot size: 30' R)			
1. VITIS ROTUNDIFOLIA	20	Y	FAC
2. UNIOLA PANICULATA	15	Y	FACU
3. LONICERA	15	Y	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	50	= Total Cover	
50% of total cover: 25	20% of total cover: 10		
Woody Vine Stratum (Plot size: 30' R)			
1. SMILAX ROTUNDIFOLIA	20	Y	FAC
2.			
3.			
4.			
5.			
	20	= Total Cover	
50% of total cover: 10	20% of total cover: 4		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 10 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	195	x 3 =	585
FACU species	120	x 4 =	480
UPL species	105	x 5 =	525
Column Totals:	420 (A)		1590 (B)

Prevalence Index = B/A = 3.78

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 2 of 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10 YR 4/3	100					FSL	Bienville Fine Sandy Loam 1-3% Slopes
3-10	10 YR 4/4	100					FSL	
10-23	10 YR 5/4	100					FSL	
23-32	10 YR 6/4	100					FSL	
32-45	10 YR 6/3	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: N/A

Depth (inches): N/A

Hydric Soil Present? Yes _____ No X

Remarks:

Natural levee. Somewhat excessively drained soils.
Hydric soil not present.

ANGELINA GATHERING COMPANY

PROPOSED HOLLIS PIPELINE PROJECT
CORNEY BAYOU SCENIC STREAM PERMIT
UNION PARISH, LOUISIANA

CULTURAL RESOURCES REPORT

PREPARED BY:
PANAMERICAN CONSULTANTS, INC.

Panamerican Consultants, Inc.

Cultural Resource Management
Maritime Archaeology
Architectural History

2 June 2013

Cultural Resources Desktop Review

Project Name: ..... Hollis Well Connect
Project Type: ..... Gathering line
Parish: ..... Union
Quad(s): ..... Lillie, Bernice

Louisiana Division of Archaeology (LDOA) files check

A 2 km radius around the proposed gathering was checked for previously recorded archeological sites and previous investigations (projects). There are no previously recorded archaeological sites known along the gathering line, but there are four within the search radius (Table 1, Figure 1).

Table 1. Previously recorded sites within the 2 km search radius.

Site	NRHP status	Description
3UN56	not eligible	prehistoric village/mortuary site
3UN83	undetermined	20th century American house site
3UN84	undetermined	20th century American house site
3UN112	undetermined	prehistoric campsite

LDOA files research reveals that seven previous archaeological investigations are documented within the search radius. Four of these reports are initial cultural investigations carried out by Cultural Resource Management (CRM) firms (22-0303, 22-1634, 22-2273, and 22-2573). One of these reports documents additional investigations carried out on a previously recorded site (22-2699). The last two reports are Annual Reports for Management Unit 2 of the Louisiana Regional Archaeology Program (22-1702 and 22-2189).

The first report is titled "A Cultural Resource Survey and Assessment of the Locations of Proposed Sewerage Facilities, Village of Spearsville, Union Parish Louisiana." In 1977, Heartfield, Price and Greene Inc. conducted a literature review and auto survey with ditch inspection for a proposed sewage facility in Spearsville, LA (LDOA Report# 22-0303). Oxidation pond and routes on undeveloped land were surveyed on foot with shovel tests. No sites found in the project right-of-way.

The second report is titled " 1990 Annual Report for Management Unit 2: Regional Archaeology Program, Department of Geoscinces, Northeast Louisiana University." In 1989 and 1990, the Northeast Regional Archaeologist, Northeast Louisiana University conducted archaeological investigations in 15 parishes in Louisiana, including Union Parish (LDOA Report# 22-1702). A total of 51 archaeological sites were visited including 27 newly recorded sites. Of these sites, 16UN56 was identified, and lies within the search radius of this Cultural Resources Desk Review.

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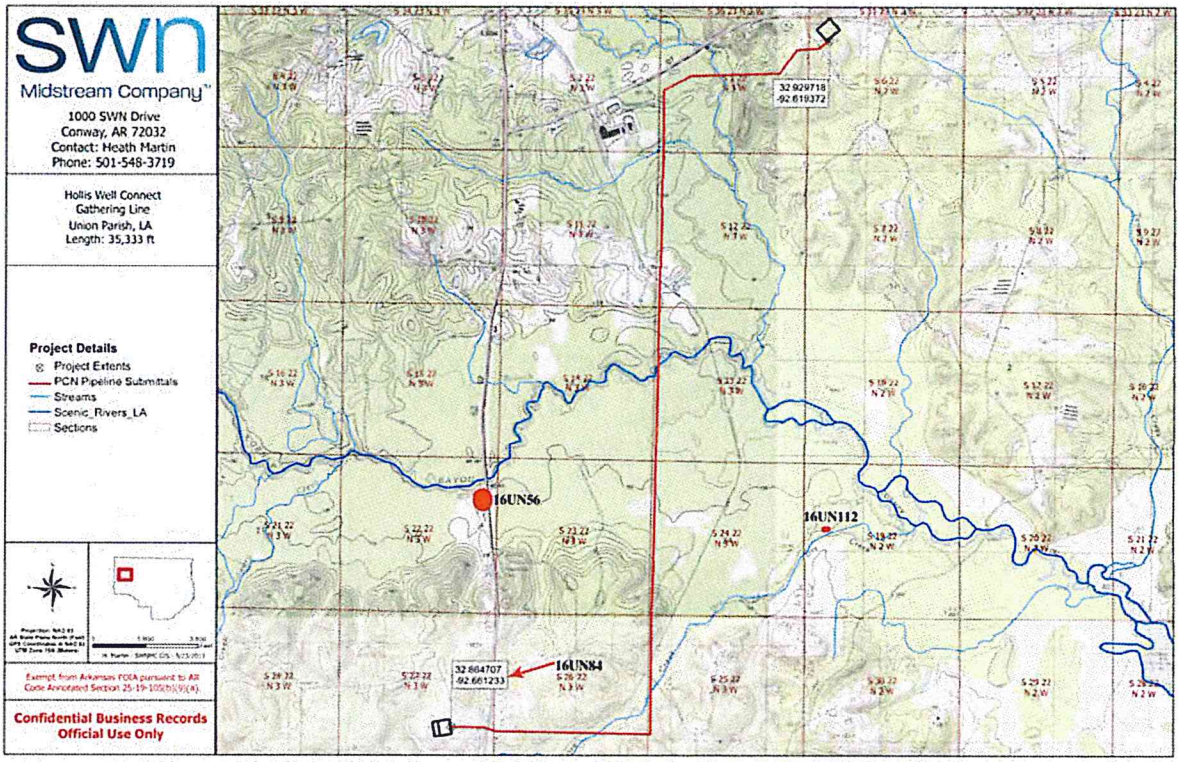

Figure 1. Hollis Well Connect project map with previously recorded archaeological sites shown.

The third report was done in 1992 and is titled "Piney Woods Past: Cultural Resources Inventory of North Central Louisiana, U.S. 167 and U.S. 425 Corridors." URS Consultants, Inc. conducted a field survey of US Hwy. 167 and US Hwy. 425 (LDOA Report# 22-1634). 16 archaeological sites and 29 standing structures were identified. This included site 16UN56, which is within the search radius of this Cultural Resources Desk Review.

The fourth report is titled "1998 Annual Report for Management Unit 2: Regional Archaeology Program, Department of Geosciences Northeast Louisiana University." In 1997 and 1998, the Northeast Regional Archaeologist, Northeast Louisiana University conducted archaeological investigations in 15 parishes in Louisiana, including Union Parish (LDOA Report# 22-2189). A total of 37 archaeological sites were visited including 24 newly recorded sites. Of these sites, 16UN112 was identified, and lies within the search radius of this Cultural Resources Desk Review.

The fifth report is titled "Cultural Resources Survey of the Proposed Trans-Union Interstate Pipeline, Claiborne and Union Parishes, Louisiana." In 2000, Coastal Environments, Inc conducted a Phase I cultural resources survey of the Trans-Union Interstate Pipeline through Louisiana (LDOA Report# 22-2273). Seven archaeological sites and one group of standing structures were identified.

The sixth report was done in 2003 and is titled "Cultural Resources Survey and Site Relocation

at Six Stream Crossings on U.S. Highway 167 and 425 Lincoln, Union, and Morehouse Parishes, La." Surveys Unlimited Research Associates, Inc conducted a reinvestigation of several culturally sensitive locations (LDOA Report# 22-2573) previously surveyed by URS Consultants, Inc. (22-1634). No newly recorded archaeological sites or standing structures were identified in this survey, but site 16UN56 was revisited and reevaluated.

The seventh report is titled "Phase II Archaeological Testing of the Morrelle Hollis Site (16UN56), Union Parish, La." Surveys Unlimited Research Associates, Inc conducted further testing in 2005 of 16UN56, a previously recorded site within the search radius of this Cultural Resources Desk Review (LDOA Report# 22-2699).

Louisiana Division of Historic Preservation (LDHP) file check

The Louisiana Historic Standing Structures Survey collection was checked for previously recorded historic structures and/or properties within a 2 km radius around the proposed gathering line. There are no historic structures and/or properties recorded along the proposed gathering line, or within the search radius.

Additional Comments

The proposed Hollis Well Connect gathering line extends for 35,333 ft. (10,769 m). The Corney Bayou crossing will be bored. The terrain is variable and includes the floodplain of Corney Bayou and a tributaries (Thompson Branch to the north and Ore Creek to the south), and uplands that overlook the floodplain.

The elevated terrace on the north side of Corney Bayou at the proposed gathering line is a high-probability location. Site 16UN56 occupies a similar setting approximately 1 mi. upstream of the proposed gathering line.

Recommendation

The elevated terrace segment of the proposed Hollis Well Connect gathering line north of Corney Bayou has a high-probability of containing archaeological resources. We recommend that a Phase I cultural resources survey be conducted at the bore location on this landform.

The remainder of the proposed gathering line has low and/or medium probability of containing unrecorded significant cultural resources.

Respectfully submitted,

C Andrew Buchner

C. Andrew Buchner, RPA

PCI REPORT NO. 33113

PANAMERICAN CONSULTANTS, INC.

BROWN DENSE CULTURAL RESOURCES REPORTS VOLUME 1: PHASE I SURVEY OF THE HOLLIS WELL CONNECT GATHERING LINE HIGH-PROBABILITY AREA, UNION PARISH, LOUISIANA

PREPARED FOR:

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NEGATIVE FINDINGS REPORT
JUNE 2013

NEGATIVE FINDINGS REPORT

BROWN DENSE CULTURAL RESOURCES REPORTS VOLUME 1: PHASE I SURVEY OF THE HOLLIS WELL CONNECT GATHERING LINE HIGH-PROBABILITY AREA, UNION PARISH, LOUISIANA

Prepared for:
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Lead Agency:
U.S. Army Corps of Engineers, Vicksburg District

Prepared by:
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Panamerican Report No. 33113

Authored by:
Harry Brignac and C. Andrew Buchner

C Andrew Buchner

C. Andrew Buchner, RPA
Principal Investigator

JUNE 13, 2013

ABSTRACT

At the request of the Southwestern Energy Company, Panamerican Consultants, Inc. performed a Phase I cultural resources survey of the high-probability segment of the proposed Hollis Well Connect gathering line. An earlier desktop study had identified the high-probability area on the northern bank of Coney Bayou along the proposed gathering line.

A field survey of the Coney Bayou crossing high-probability area along the proposed Hollis Well Connect gathering line was conducted on 5 June 2013, it produced negative findings. During the survey, two shovel test locations were excavated on an elevated landform along the bayou. Both were negative for cultural material. The area to the north was found to be a flooded backswamp.

As no cultural resources were encountered at the Hollis Well Connect gathering line high-probability segment, we recommend this area be cleared from further archaeological work.

ACKNOWLEDGEMENTS

Panamerican Consultants, Inc. appreciates the opportunity to provide the Southwestern Energy Company with our services. Heath Martin was our point of contact during the study.

Panamerican Consultants, Inc. personnel that contributed to the project included the following. Harry Brignac, RPA conducted the fieldwork and prepared sections of this report. Anna Hinnenkamp-Faulk edited the document. Kate Gilow provided administrative support throughout.

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I. INTRODUCTION

At the request of the Southwestern Energy Company (SWN), Panamerican Consultants, Inc. (Panamerican) of Memphis, Tennessee performed a Phase I cultural resources survey of the high-probability segment of the proposed Hollis Well Connect in Union Parish, Louisiana. The purpose of the survey was to identify any cultural resource that is listed on, eligible for, or potentially eligible for the National Register of Historic Places (NRHP). The project was conducted to assist SWN in complying with U.S. Army Corps of Engineers (USACE) nationwide permitting. Fieldwork performed within the high-probability area conformed to the Louisiana Division of Archaeology's (LDOA's) "Field Standards for Terrestrial Phase I Cultural Resources Surveys" for rural and non-urban areas (Louisiana Department of Culture, Recreation, and Tourism 2013).

PROJECT DESCRIPTION

The Hollis Well Connect gathering line is located in Union Parish, Louisiana (Figure 1-01). It is part of the midstream infrastructure associated with SWN's Lower Smackover Brown Dense (LSBD) formation exploration program that produces oil condensate and natural gas.

The proposed Hollis Well Connect gathering line extends for 35,333 ft. (10,769 m). The terrain is variable and includes the floodplain of Corney Bayou and tributaries, and uplands that overlook the floodplain. The elevated terrace on the northern side of Corney Bayou at the proposed gathering line is a high-probability location.

The legal description of the high-probability area is the area is the NW¼ of Section 13 of T22N R2W. This location can be found on the Lillie, LA 7.5-min. quadrangle.

This cultural resource investigation developed as follows. On 23 May 2013, SWN requested that Panamerican prepare a cultural resources desktop review for the Hollis Well Connect gathering line. The desktop review was submitted on 2 June 2013. In the desktop review the Coney Bayou crossing was indentified as "high-probability" area, and a survey was recommended of this segment. SWN issued notice to proceed with the survey on 3 June 2013. This report documents the results of the survey of the high-probability area.

REPORT OUTLINE

The technical report contained herein is organized in the following manner (see also *Table of Contents*). The most salient aspects of the local environmental setting are outlined in Chapter II. Because this is a negative findings report there is no discussion of the local cultural sequence. The results of the literature and records search are presented in Chapter III. The field methods and results are presented in Chapter IV. Chapter V provides a summary and recommendation. A References Cited section follows.

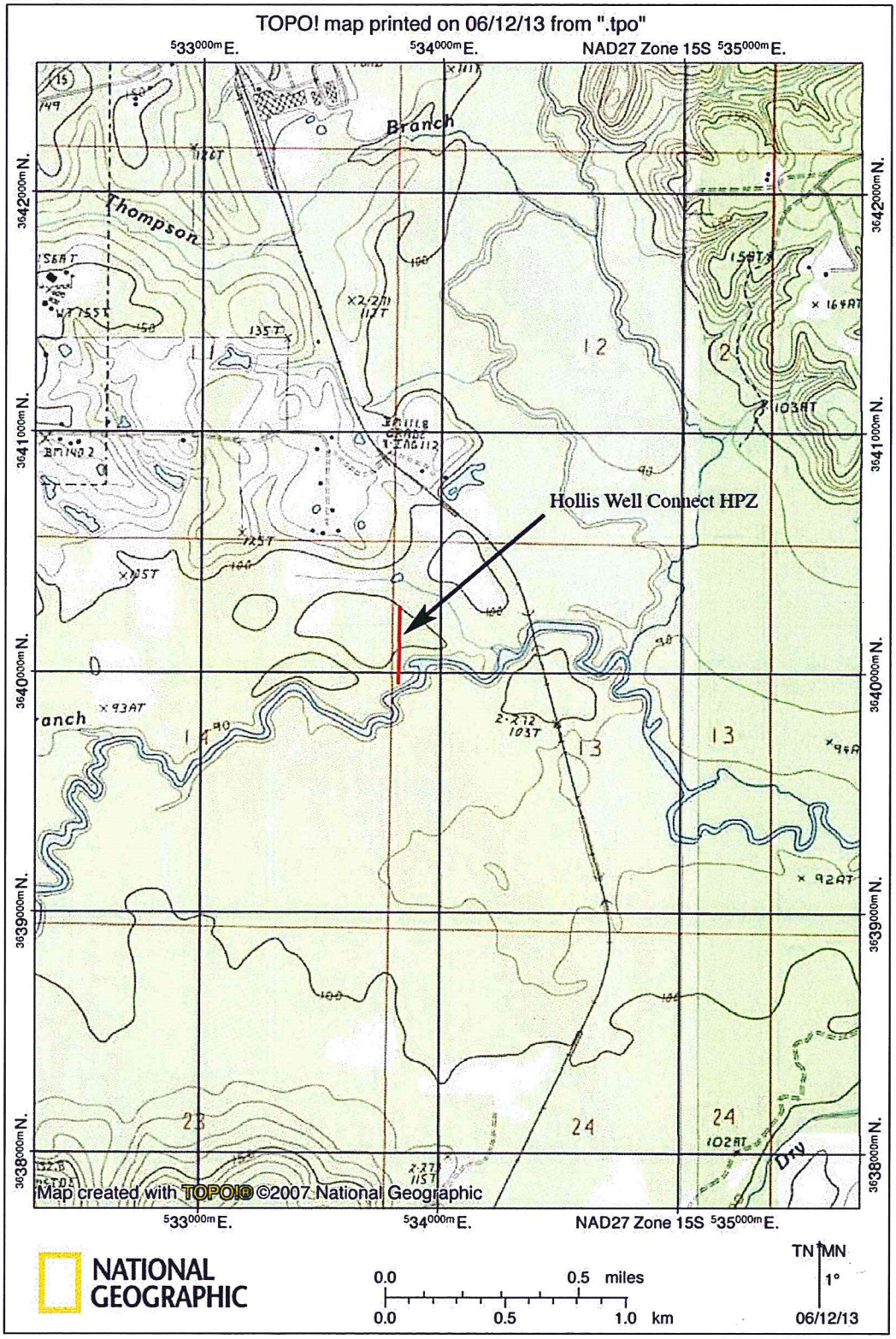

Figure 1-01. Quad map locator for the Hollis Well Connect gathering line high-probability area (base map: Lillie, LA 7.5-min. quad).

II. ENVIRONMENTAL SETTING

NATURAL REGIONS

The study area is found within the South Central Plains, a Level III ecoregion in Diagle et al.'s (2006) ecoregions of Louisiana map. This ecoregion is considered part of the West Gulf Coast Plain physiographic province of older literature (Fenneman 1938:100). This province is clearly bounded by the Mississippi River on the east and the Ouachita Mountains to the north, but its western boundary (in Texas) is difficult to define, as the province grades into the Great Plains. The West Gulf Coast Plain is composed of a series of belts that are commonly characterized by their underlying geologic formations (Fenneman 1938:103-104). The belts are relatively young (Cretaceous and younger) and are progressively younger from the Ouachitas to the coast. Within the West Gulf Coast Plain there are several major escarpments, and in central Louisiana the most prominent is the Kisatchie Cuesta. Fenneman (1938:110) describes it as "the most prominent relief feature in Louisiana." The Kisatchie Cuesta is on the edge of the Catahoula formation, which is Miocene-aged sandstone.

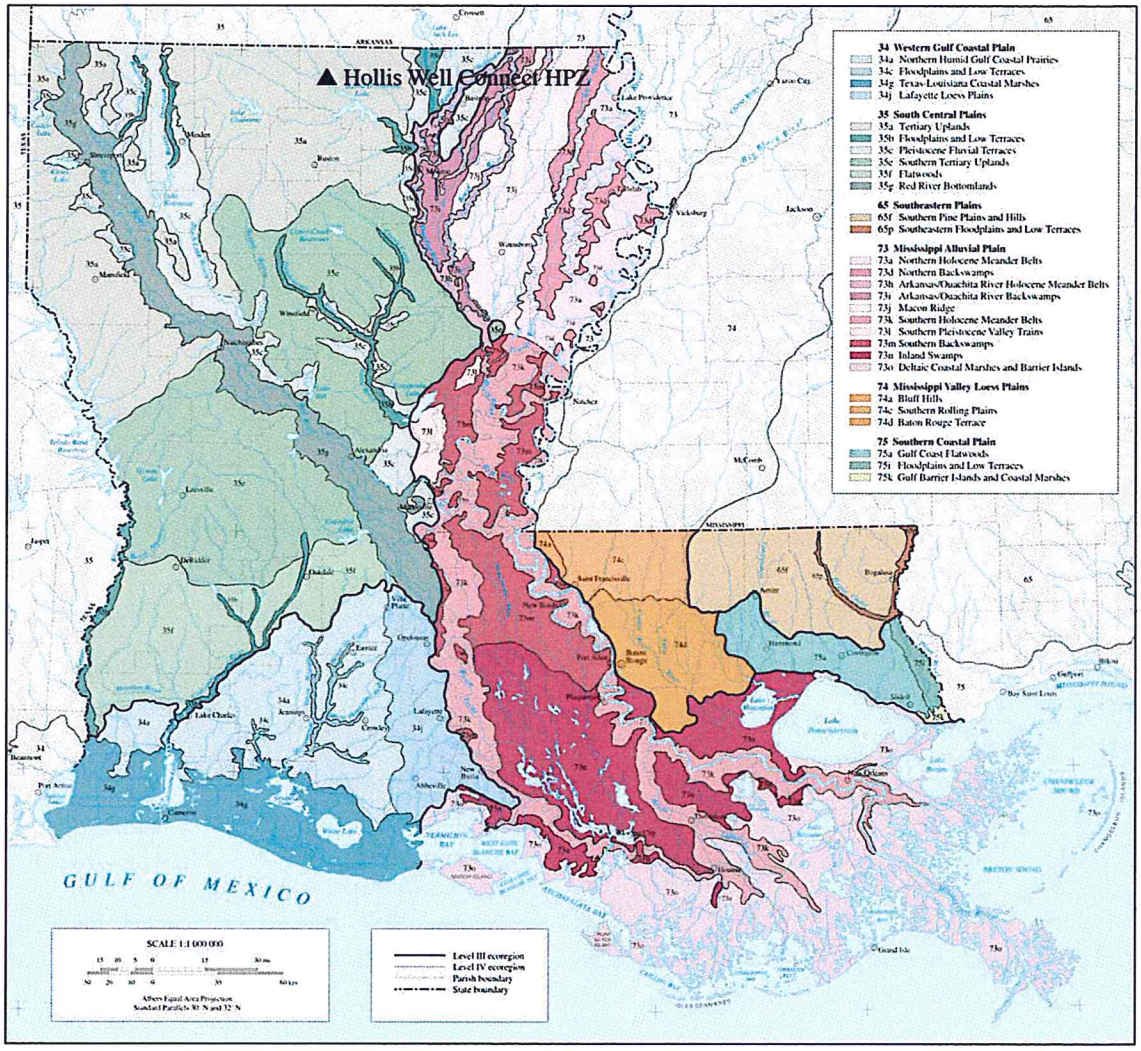

Figure 2-01. Study area shown on an ecoregions of Louisiana map (after Daigle et al. 2006).

The South Central Plains is subdivided into six Level IV ecoregions, and the study area is located on the Tertiary Uplands (35a). The Tertiary Uplands cover 5,499 mi.^{2}, and consist of hilly uplands formed by extensive dissection of bedrock strata. Elevations range 65–535 ft., and the local relief ranges 50–300 ft.

GEOLOGY

The surface geology of the uplands in the Dense Brown play area is characterized by the Eocene-aged (Tertiary) units of the Claiborne Group: the Cockfield Formation (Ecf) and the Cook Mountain Formation (Ecm). The Cockfield Formation is composed of brown lignitic clays, silts, and sands; and some sideritic glauconite may weather to brown ironstone in the lower part. The Cook Mountain Formation is characterized by greenish gray sideritic, glaucontic clay in the upper part that may weather to brown ironstone; yellow to brown clays and fossiliferous marl in the lower part that may weather to black soil. There are ironstone concretions near the base of the Cook Mountain Formation.

LOWER SMACKOVER BROWN DENSE

The Lower Smackover Brown Dense formation is an unconventional oil reservoir found in southern Arkansas and northern Louisiana (Southwestern Energy Company 2013). The formation ranges in vertical depths 8,000–11,000 ft. and appears to be laterally extensive over a large area ranging in thickness 300–550 ft. SWN has approximately 507,000 net acres targeting the LSBD formation located in southern Arkansas and northern Louisiana, and to date has drilled eight wells (Figure 2-02).

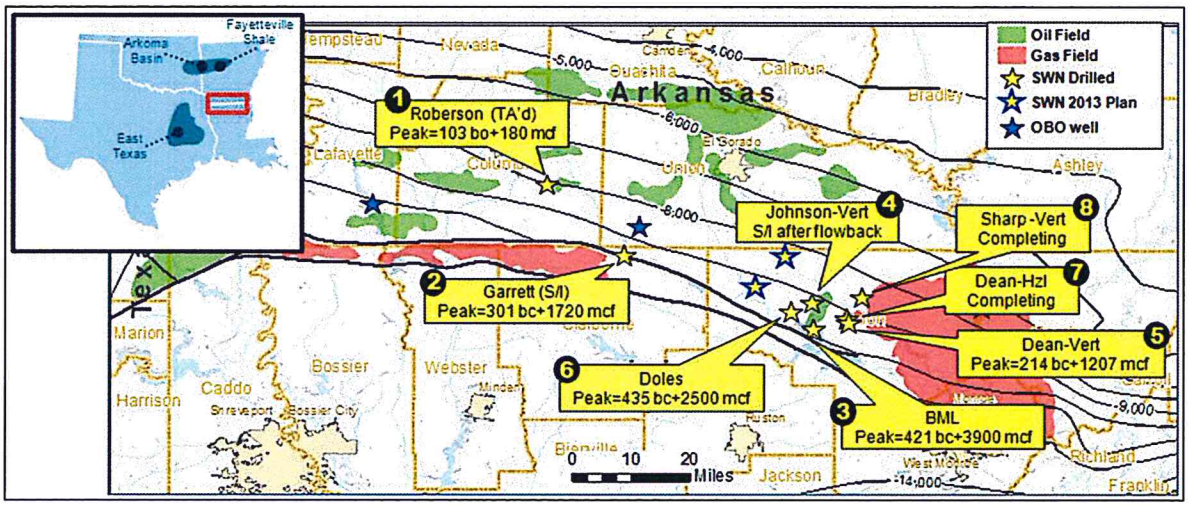

Figure 2-02. SWN Brown Dense map (after Southwestern Energy Company 2013).

The LSBD formation is an Upper Jurassic-aged, kerogen-rich carbonate source rock found across the Gulf Coast region of the southern U.S. from Texas to Florida (Southwestern Energy Company 2013). SWN extensively reviewed the LSBD across the region and has indications that the right mix of reservoir depth, thickness, porosity, matrix permeability, sealing formations, thermal maturity, and oil characteristics are found in the area of southern Arkansas and northern Louisiana. This region of Arkansas and Louisiana has produced oil and gas from the Upper Smackover since the 1920s. The LSBD formation is the source rock for these Upper Smackover fields. The LSDB has the critical properties necessary to be a successful play and compares favorably to other productive oil plays in the U.S. However, it has never been exploited with horizontal drilling technology until now.

SOILS

Common soil series within the South Central Plains Tertiary Uplands include: Sacul; Mahan; Darley; Bowie; Keithville; Irvin; and Wolfpen (Daigle et al. 2006). On floodplains Guyton, Ochlockonee, Ouachita, Iuka, and Dela soil series prevail.

At least 11 major soil associations are recognized within the LSDB area:

- Eastwood-Angie-Bowie
- Sacul-Bowie
- Eastwood-Wolfpen
- Flo-Smithdale-McLaurin
- Sacul-Wolfpen-Darley
- Darley-Mahan
- Ruple-Sacul-Darley
- Darley-Sacul
- Darley-Bowie
- Sacul-Darley-Darbonne
- Guyton-Iuka-Ocuachita

The specific soil types for each gathering line can be found within the relevant parish soil books.

VEGETATION

The native climax vegetation of the study area is dominated by the Southern Pine Forest, comprised chiefly of longleaf pine. However, due to logging, extensive areas of slash pine, loblolly, shortleaf, and longleaf pine are now present. Slash pine was introduced to the area around 100 years ago when logging was very intensive. Other common trees in the uplands include the southern red oak, white oak, post oak, red maple, sweet gum, and sassafras (Anderson et al. 1999; Daigle et al. n.d.). Lowland areas are dominated by loblolly pines and a mixed fluvial woodland that is composed of hickory, water oaks, sweet gum, and swamp chestnuts.

Three other natural biotic communities are also associated with the upland longleaf pine forests. These include wooded seeps, hillside bogs, and sandy woodlands. Wooded seeps, shortleaf pine/oak-hickory forests, and mixed hardwood-loblolly forests are present on ridge slopes and terraces, while the bottomlands are dominated by fluvial woodlands (Louisiana Natural Heritage Program 1992). The numerous shrubs in the area include yaupon, bitter gallberry, St. Andrew's cross, and blueberry, while the understory also contains such species as poison ivy, yellow jasmine, and rattan. A variety of native grasses, forbs, and other plants also occur including pinehill bluestem, pinewoods dropseed, splitbeard bluestem, longleaf uniola, sedge, tickclover, American beautyberry, and brackenfern (Daigle et al. n.d.).

FAUNA

A host of mammals, reptiles, amphibians, birds, and fishes inhabit north Louisiana. Some of the more common species include white-tailed deer, rabbit, gray squirrel, fox squirrel, wild turkey, raccoon, and opossum (Cantley et al. 1993:23; Daigle et al. n.d.). Other large mammals include fox, bobcat, mink, skunk, weasel, and coyote, while small mammals include the eastern cotton

rat, cotton mouse, short-tailed shrew, eastern harvest mouse, golden mouse, rice rat, fulvous harvest mouse, and plains pocket gopher (Cantley et al. 1993). A wide range of birds are present including such lowland species as little blue heron, green heron, and wood duck. Birds common to upland areas include cardinals, pine warblers, crows, sparrows, summer tanagers, blue grosbeak, and mockingbirds (Cantley et al. 1993). Hawks and owls also occur along with wild turkey, bobwhite quail, woodcock, rail, and snipe. Snakes include the rat snake, coachwhip, copperhead, and cottonmouth while American chameleon, five-lined skink, three-toed box turtle, and the American alligator are also present. Amphibians include the gulf coast toad, northern cricket frog, and green tree frog. Fishes include spotted bass, redfin shiners, blackstrip topminnows, blackspotted topminnows, and bluntnose darters (Cantley et al. 1993:23; Daigle et al. n.d.).

HOLOCENE CLIMATE

The climate of central and northern Louisiana may be classified as humid-subtropical with warm, temperate, and humid conditions predominating throughout the year due to its proximity to the Gulf of Mexico. The growing season is long, with the majority of the South Central Plains having 230–250 frost-free days (Diagle et al. 2006). July is typically the warmest month, with average daily minimum/maximum temperatures of 70° and 94°, while January is typically the coldest month with average daily minimum/maximum temperatures of 33° and 58°. Annual precipitation across the South Central Plains ecoregion ranges 51–58 in.

PALEO CLIMATE

Several researchers, including Delcourt and Delcourt (1983, 1985) and Wright (1983), have examined the paleoenvironmental data to detect regional shifts in vegetation communities during the Pleistocene/Holocene periods in the southeastern U.S. There is evidence based on pollen data that during the Pleistocene/Holocene transition a cool, moist climate prevailed that resulted in a deciduous forest cover over this portion of Louisiana. The deciduous forest replaced cool weather trees such as jackpine and spruce (Anderson et al. 1999). This was followed by a shift to a warmer, drier climate known as the Hypsithermal period that occurred during the mid-Holocene over a wide expanse of the Southeast. Plant and animal communities most likely varied in response to these changing environmental conditions. Gunn and Brown (1982:182-183) have suggested that a decline in local biomass yield was one likely result of the Hypsithermal period in Vernon Parish (i.e., Fort Polk) and that plant communities and animal populations would not have supported a very large prehistoric population. After 3,500 years before present (YBP) a return to cooler and wetter conditions evidently took place. This may have resulted in a more stable plant community and allowed a larger aboriginal population in central Louisiana. Recent geomorphological, stable carbon isotope, and faunal data from southeast Texas in the vicinity of Trinity Bay established a paleoenvironmental sequence that adds support to the above scenario. Evidence of a warmer, drier climate was found prior to 4,000 YBP followed by the onset of modern environmental conditions and a wetter climate (Ensor 1998; Ricklis 1998). A population increase evidently took place after 4,000 YBP during the Middle to Late Archaic periods, although short-term climatic fluctuations occurred.

III. LITERATURE AND RECORDS CHECK

The results of the literature and records search were previously reported in the 3 June 2013 desktop review. Importantly, there are no previously recorded archaeological sites or historic properties along the proposed Hollis Well Connect gathering line.

LOUISIANA DIVISION OF ARCHAEOLOGY

SITE FILES

A 2-km radius around the proposed gathering line was checked for previously recorded archeological sites and previous investigations (projects). There are no previously recorded archaeological sites known along the gathering line, but there are four within the search radius (Table 3-01 and Figure 3-01).

Table 3-01. Previously recorded sites within the 2-km search radius.

Site	NRHP Status	Description
16UN56	not eligible	prehistoric village/mortuary site
16UN83	undetermined	twentieth century American house site
16UN84	undetermined	twentieth century American house site
16UN112	undetermined	prehistoric campsite

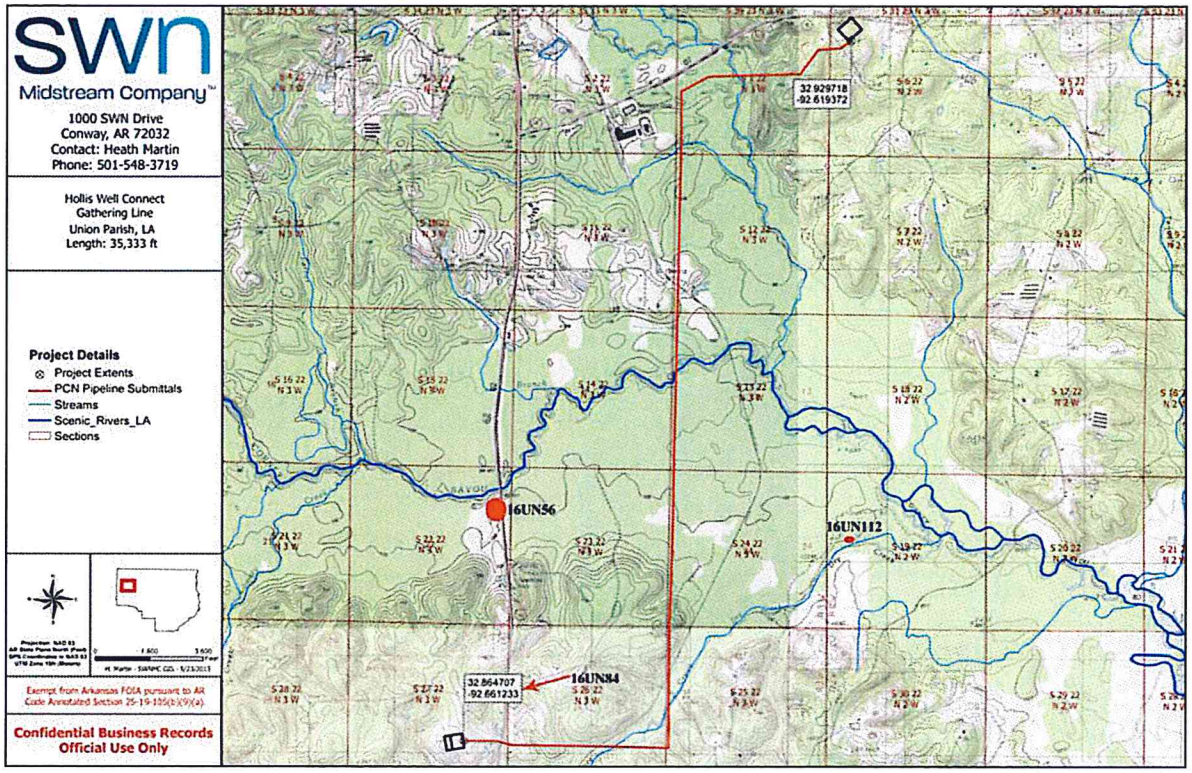

Figure 3-01. Hollis Well Connect gathering line project map with previously recorded archaeological sites shown.

PREVIOUS INVESTIGATIONS

LDOA files research reveals that seven previous archaeological investigations are documented within the search radius. Four of these reports are initial cultural investigations carried out by Cultural Resources Management firms (LDOA Report# 22-0303, 22-1634, 22-2273, and 22-2573). One of these reports documents additional investigations carried out on a previously recorded site (22-2699). The last two reports are Annual Reports for Management Unit 2 of the Louisiana Regional Archaeology Program (22-1702 and 22-2189).

The first report is titled *A Cultural Resources Survey and Assessment of the Locations of Proposed Sewerage Facilities, Village of Spearsville, Union Parish Louisiana.* In 1977, Heartfield, Price, and Greene Inc. conducted a literature review and auto survey with ditch inspection for a proposed sewage facility in Spearsville, LA (LDOA Report# 22-0303). Oxidation pond and routes on undeveloped land were surveyed on foot with shovel tests. No sites found in the project right-of-way.

The second report is titled *1990 Annual Report for Management Unit 2: Regional Archaeology Program, Department of Geoscinces, Northeast Louisiana University.* In 1989 and 1990, the Northeast Regional Archaeologist, Northeast Louisiana University conducted archaeological investigations in 15 parishes in Louisiana, including Union Parish (LDOA Report# 22-1702). A total of 51 archaeological sites were visited including 27 newly recorded sites. Of these sites, 16UN56 was identified (see Table 3-01 and Figure 3-01).

The third report was done in 1992 and is titled *Piney Woods Past: Cultural Resources Inventory of North Central Louisiana, U.S. 167 and U.S. 425 Corridors.* URS Consultants, Inc. conducted a field survey of U.S. Highways 167 and 425 (LDOA Report# 22-1634). Sixteen archaeological sites and 29 standing structures were identified. This again included site 16UN56 (see Table 3-01 and Figure 3-01).

The fourth report is titled *1998 Annual Report for Management Unit 2: Regional Archaeology Program, Department of Geosciences Northeast Louisiana University.* In 1997 and 1998, the Northeast Regional Archaeologist, Northeast Louisiana University conducted archaeological investigations in 15 parishes in Louisiana, including Union Parish (LDOA Report# 22-2189). A total of 37 archaeological sites were visited including 24 newly recorded sites. Of these sites, 16UN112 was identified (see Table 3-01 and Figure 3-01).

The fifth report is titled *Cultural Resources Survey of the Proposed Trans-Union Interstate Pipeline, Claiborne and Union Parishes, Louisiana.* In 2000, Coastal Environments, Inc. conducted a Phase I cultural resources survey of the Trans-Union Interstate Pipeline through Louisiana (LDOA Report# 22-2273). Seven archaeological sites and one group of standing structures were identified.

The sixth report was done in 2003 and is titled *Cultural Resources Survey and Site Relocation at Six Stream Crossings on U.S. Highway 167 and 425 Lincoln, Union, and Morehouse Parishes, La.* Surveys Unlimited Research Associates, Inc. conducted a reinvestigation of several culturally sensitive locations (LDOA Report# 22-2573) previously surveyed by URS Consultants, Inc. (22-1634). No newly recorded archaeological sites or standing structures were identified in this survey, but site 16UN56 was revisited and reevaluated (see Figure Table 3-01 and Figure 3-01).

The seventh report is titled *Phase II Archaeological Testing of the Morrelle Hollis Site (16UN56), Union Parish, La.* In 2005, Surveys Unlimited Research Associates, Inc. conducted further testing of 16UN56 (see Table 3-01 and Figure 3-01; LDOA Report# 22-2699).

LOUISIANA DIVISION OF HISTORIC PRESERVATION

The Louisiana Historic Standing Structures Survey collection was checked for previously recorded historic structures and/or properties within a 2-km radius around the proposed gathering line. There are no historic structures and/or properties recorded along the proposed gathering line or within the 2-km search radius.

IV. FIELDWORK

METHODS

On 5 June 2013, Harry G. Brignac, Jr. conducted a cultural resources survey of the Hollis Well Connect gathering line in Union Parish, Louisiana. The main objectives in conducting the intensive archaeological survey were as follows: (1) to obtain a complete inventory of all significant cultural resources present, and (2) to evaluate all identified resources relative to eligibility criteria of the NRHP (36 CFR 63). No data recovery beyond the constraints of an intensive (shovel test) survey and site boundary delineation was expected.

The project area (Figures 4-01–4-05) was subjected to an intensive archaeological survey using the methods outlined below. The basic survey method consisted of shovel testing at 30-m intervals—the standard interval for high-probability areas in Louisiana—along the centerline within the 70-ft. Right Of Way (ROW). Figure 4-04 shows a field map of the project area. Both shovel tests were dug in optimal locations within the project area and are discussed below.

Shovel Test (ST) 1 was placed next to Survey Point 585, about 4 m north of Corney Bayou. Two natural strata were observed in ST 1. Stratum 1 (0–65 cm below the surface [cmbs]) was recorded as 10YR5/4 yellowish brown loamy sand. Stratum 2 (65–80 cmbs) was a 10YR6/4 light yellowish brown clay sand mottled with 10YR5/6 yellowish brown clay (Figure 4-05). This stratum, although fairly dry, showed signs of periodical saturation. ST 1 produced 0 artifacts.

ST 2 was dug 26 m north of ST 1, on a high spot about 10 m south of the backswamp. Two natural strata were observed in ST 2. Stratum 1 (0–45 cmbs) was identified as a 10YR4/4 dark yellowish brown loamy sand. Stratum 2 (45–65 cmbs) was a 10YR6/4 light yellowish brown clay sand mottled with 10YR5/6 yellowish brown clay just like Stratum 2 for ST 1. ST 2 produced 0 artifacts as well.

Shovel tests are designed to sample near surface deposits for the presence or absence of artifacts. A shovel test is defined as the excavation of a four-sided hole at least 30 cm to a side (0.09 m^2). Each shovel test was excavated to culturally sterile deposits, per Louisiana State regulations. To ensure consistent artifact recovery, all sediment was hand-screened through 0.25-in. mesh hardware cloth. All natural and cultural strata revealed in the individual shovel test profiles were recorded using metric depth measurements, and described in terms of textural class and color (using the Munsell Soil Color Chart). Additional strata descriptions were provided as necessary, such as moisture, natural rock content, and number and size of roots. Panamerican employs a specialized shovel test form to ensure consistent recordation of shovel test profiles. Following recordation, each shovel test was subsequently backfilled as closely as possible to its original condition.

Field documentation included, but was not limited to, the following tasks: (1) the field director maintained a set of field notes that outlined daily activities and provides a general commentary on the project findings, as well as noting any unique or significant findings; (2) the survey area was recorded via digital photography; and (3) a number of logs or lists were maintained, including film records.

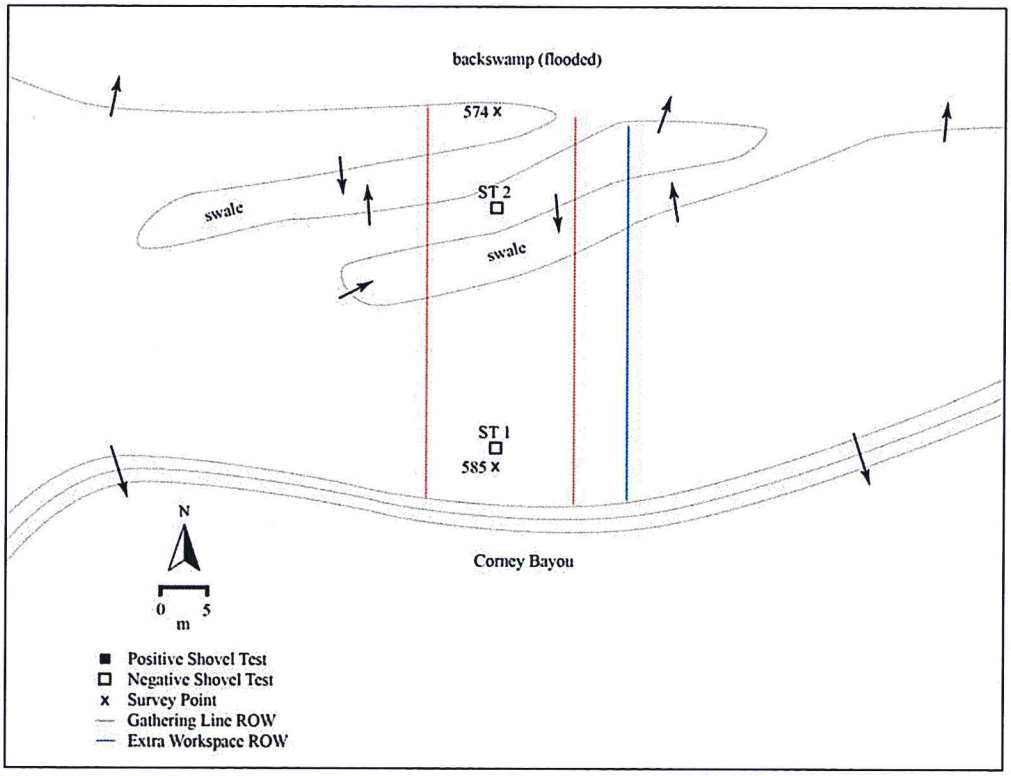

Figure 4-01. Sketch map of the high-probability area.

Figure 4-02. Shovel Test 1; facing south across Corney Bayou.

Figure 4-03. Shovel Test 1; facing east.

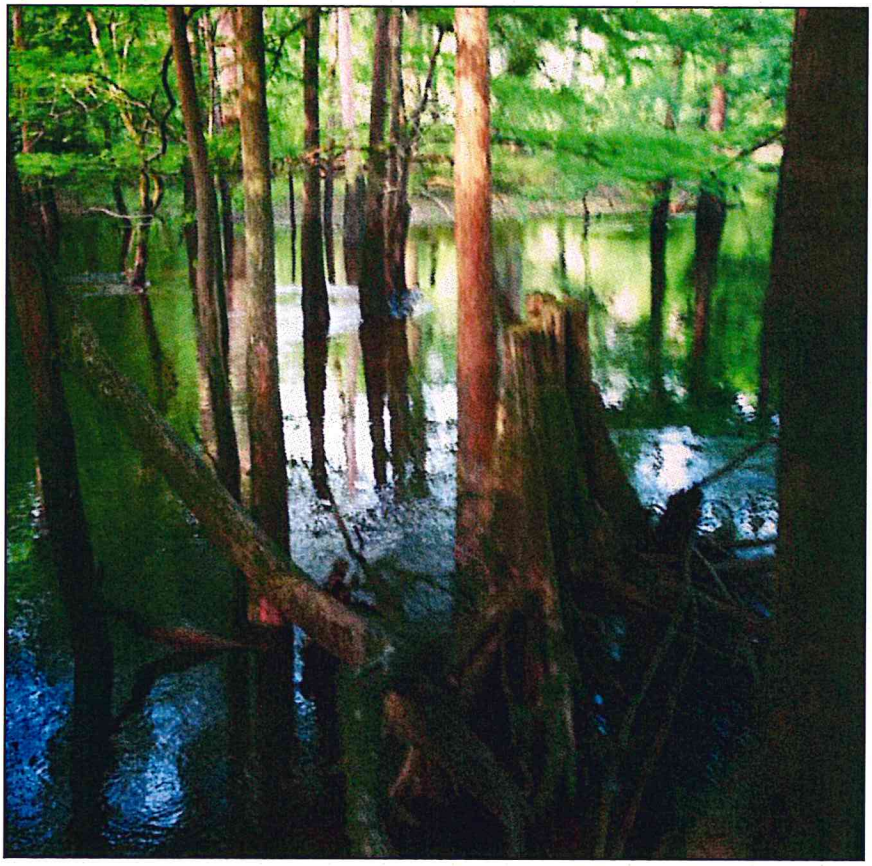

Figure 4-04. Survey Point 574; facing north at backswamp.

Figure 4-05. Shovel Test 1; western profile.

FINDINGS

Survey of the Hollis Well Connect gathering line in Union Parish resulted in the recording of no new sites.

V. SUMMARY AND RECOMMENDATIONS

SUMMARY

At the request of SWN, Panamerican performed a Phase I cultural resources survey of the high-probability segment of the proposed Hollis Well Connect gathering line in Union Parish, Louisiana (see Figure 1-01). The purpose of the survey was to identify any cultural resource that is listed on, eligible for, or potentially eligible for the NRHP.

The proposed Hollis Well Connect gathering line extends for 35,333 ft. (10,769 m), and an elevated terrace on the northern side of Corney Bayou was identified as a high-probability location.

This cultural resources investigation developed as follows. On 23 May 2013, SWN requested that Panamerican prepare a cultural resources desktop review for the Hollis Well Connect gathering line. The desktop review was submitted on 2 June 2013. In the desktop review the Coney Bayou crossing was indentified as high-probability area and a survey of this segment was recommended. SWN issued notice to proceed with the survey on 3 June 2013. This report documented the results of the survey of the high-probability area.

Review of LDOA facility records indicates that there are no previously recorded sites within the surveyed area. Within a 2-km radius of the Area of Potential Effect (APE) there are four previously recorded archaeological sites (see Table 3-01 and Figure 3-01). No NRHP-listed properties are located in the APE. Additionally, there are no NRHP-listed properties within 2 km of the APE.

The fieldwork was conducted on 5 June 2013. Two shovel tests were dug on elevated terrace landforms north of Caney Bayou at 30-m intervals. Both were sterile. The area farther north was a flooded, wooded backswamp and was not shovel tested.

No cultural resources were identified at the Hollis Well Connect gathering line high-probability area.

RECOMMENDATIONS

No cultural resources were identified within the high-probability area. No further cultural resources investigations are recommended.

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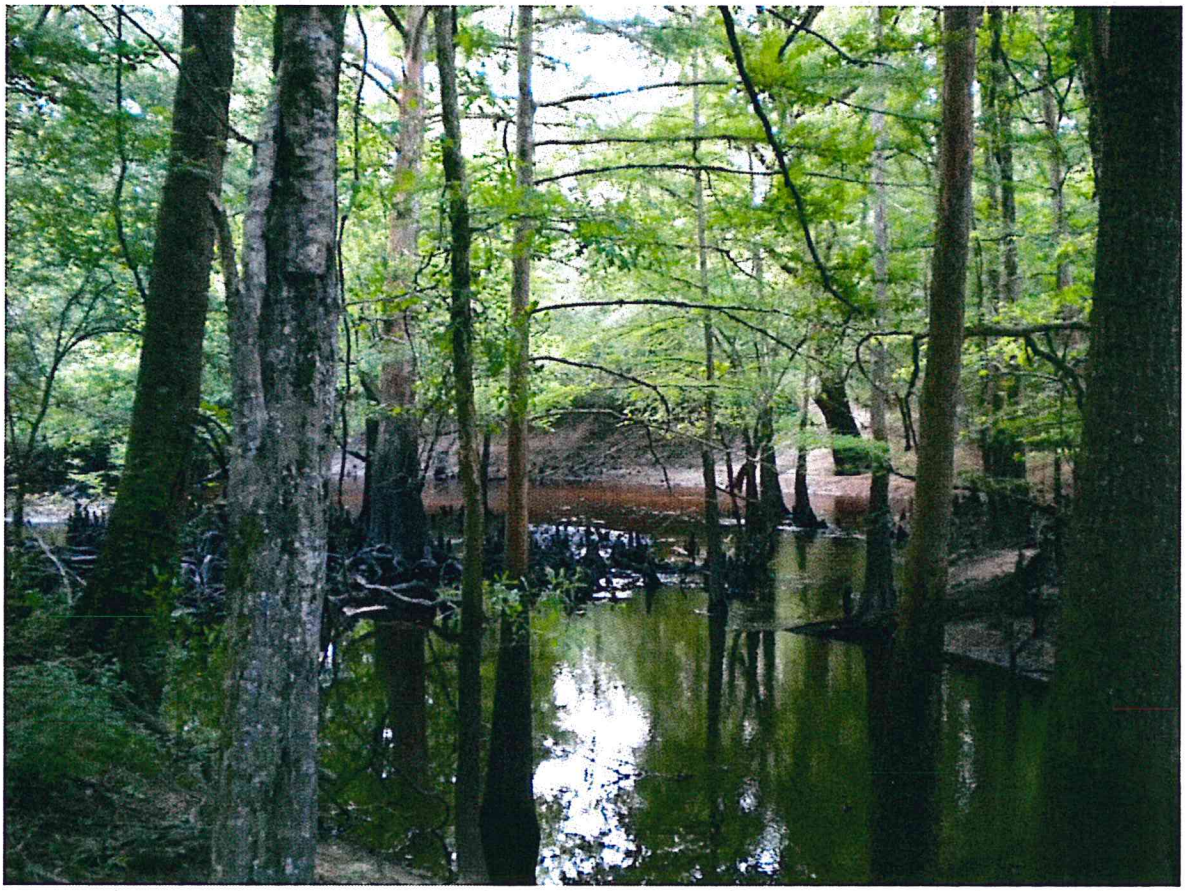
ANGELINA GATHERING COMPANY

PROPOSED HOLLIS PIPELINE PROJECT
CORNEY BAYOU SCENIC STREAM PERMIT
UNION PARISH, LOUISIANA

PHOTOGRAPHS OF PROJECT SITE



Photograph: 1

Project: Angelina Gathering Company
Proposed Hollis Pipeline at Corney Bayou

Photo Description: This view is the north side of the creek crossing looking downstream (eastward) from the top bank.

Photograph: 2

Project: Angelina Gathering Company
Proposed Hollis Pipeline at Corney Bayou

Photo Description: This view is the north side of the creek crossing looking upstream (westward) from the top bank.

Photograph: 3

Project: Angelina Gathering Company
Proposed Hollis Pipeline at Corney Bayou

Photo Description: This view is the north side of the creek crossing looking southward along the proposed pipeline route.

Photograph: 4

Project: Angelina Gathering Company
Proposed Hollis Pipeline at Corney Bayou

Photo Description: This view is the south side of the creek crossing looking downstream (eastward) from the top bank.

Photograph: 5

Project: Angelina Gathering Company
Proposed Hollis Pipeline at Corney Bayou

Photo Description: This view is the south side of the creek crossing looking upstream (westward) from the top bank.

Photograph: 6

Project: Angelina Gathering Company
Proposed Hollis Pipeline at Corney Bayou

Photo Description: This view is the south side of the creek crossing looking northward along the proposed pipeline route.

PROPOSED HOLLIS PIPELINE PROJECT
CORNEY BAYOU SCENIC STREAM PERMIT

LIST OF AGENCIES PROVIDED COPIES OF THE PROPOSAL

1. U.S. Army Corps of Engineers, Vicksburg District

2. Louisiana State Historical & Cultural Resource Division (Notification of Route)